

WHAT IS CLAIMED IS:

1. A semiconductor optical device comprising:  
a semiconductor substrate having a main surface;  
a stripe-shaped optical waveguide, disposed on said  
5 main surface of said semiconductor substrate, including an  
active layer;

a current blocking part, disposed on said  
semiconductor substrate, having said optical waveguide  
buried therein;

10 a electrically conductive layer disposed on said  
optical waveguide and current blocking part;

a first electrode electrically connected to said  
semiconductor substrate, and a second electrode  
electrically connected to said electrically conductive  
15 layer; and

a trench having a bottom in contact with said current  
blocking part.

2. A semiconductor optical device according to  
claim 1, wherein said current blocking part includes a  
20 blocking semiconductor layer comprising an InP  
semiconductor doped with Fe.

3. A semiconductor optical device according to  
claim 2, wherein said blocking semiconductor layer has a  
thickness of at least 1  $\mu\text{m}$ .

25 4. A semiconductor optical device according to  
claim 2, wherein said current blocking part further includes

a hole blocking layer comprising an InP semiconductor of a conductivity type opposite from that of said electrically conductive layer.

5           5.     A semiconductor optical device according to claim 2, wherein said blocking semiconductor layer has an Fe concentration of at least  $5 \times 10^{15} \text{ cm}^{-3}$ .

6.     A semiconductor optical device according to claim 2, wherein said blocking semiconductor layer has an Fe concentration of  $5 \times 10^{16} \text{ cm}^{-3}$  or less.

10           7.     A semiconductor optical device according to claim 1, further comprising an insulating film disposed on a surface of said trench.

15           8.     A semiconductor optical device according to claim 7, wherein said insulating film comprises an insulating silicon compound.

          9.     A semiconductor optical device according to claim 1, wherein said optical waveguide comprises a first conductivity type semiconductor layer, a second conductivity type semiconductor layer, and an active layer;  
20           said active layer being provided between said first and second conductivity type semiconductor layers.

10.    A semiconductor laser device comprising the semiconductor optical device according to claim 9.

25           11.    A semiconductor optical modulation device comprising the semiconductor optical device according to claim 9.

12. A semiconductor optical integrated device comprising:

a semiconductor substrate having a main surface, said main surface including a laser device region and an optical modulation device region arranged in a predetermined direction;

a stripe-shaped first optical waveguide longitudinally extending in said predetermined direction on said laser device region;

a stripe-shaped second optical waveguide longitudinally extending in said predetermined direction on said optical modulation device region;

a current blocking part, disposed on said semiconductor substrate, having both of said first and second optical waveguides buried therein;

a electrically conductive layer disposed on said current blocking part and first optical waveguide on said laser device region;

a electrically conductive layer disposed on said current blocking part and second optical waveguide on said optical modulation device region;

a first electrode electrically connected to said semiconductor substrate, a second electrode electrically connected to said electrically conductive layer on said laser device region, and a third electrode electrically connected to said electrically conductive layer on said optical

modulation device region; and

a trench extending in said predetermined direction along said first and second optical waveguides and having a bottom in contact with said current blocking part;

5 each of said first and second optical waveguides including a first conductivity type semiconductor layer, a second conductivity type semiconductor layer, and an active layer;

10 said active layer being provided between said first and second conductivity type semiconductor layers.